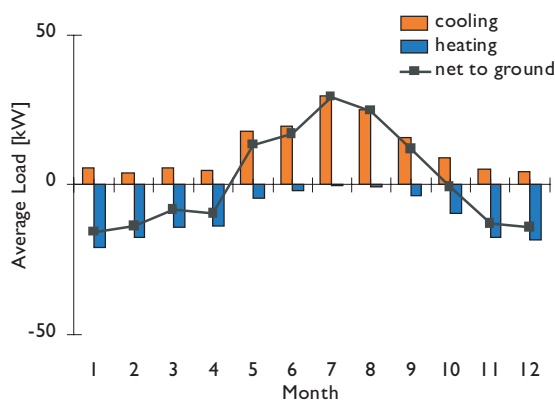


Geothermal sustainability assessment London, UK

Client **Atelier ten**

Dates **2007**

Main tasks Numerical modelling for sustainability assessment of an open loop geothermal system



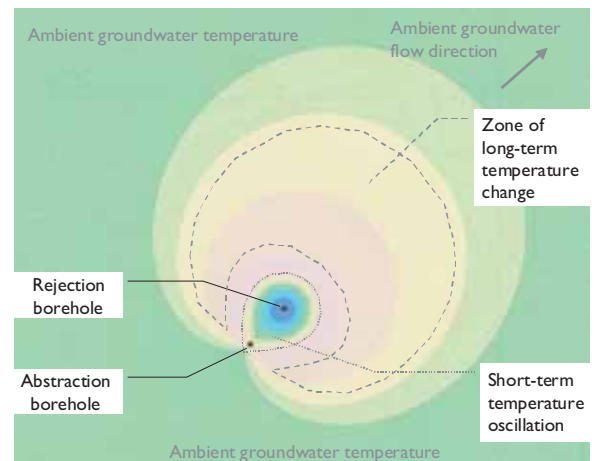
Annual load profile of a balanced ground source heat pump scheme

Background

The “Merton Rule” is a planning policy which requires part of a new development’s energy needs to come from renewable energy generated on site. This rule has been adopted by many authorities across the UK; most require 10% of the energy requirements to be renewable, but some have set higher targets. Open loop ground source heat pump systems (also known as geothermal schemes) are a cost effective means of achieving this.

Zenith International was commissioned to evaluate the sustainability of a proposed open loop geothermal scheme. The scheme comprised 20 boreholes to serve a planned net cooling load of about 10 GWh/a; this type of load is “imbalanced”.

The large size of the geothermal scheme and the load imbalance means there was a high risk that the scheme would not be sustainable.



Temperature distribution after 25 years simulated operation of an open loop scheme

The project

We constructed a numerical heat transport model of the planned open loop geothermal scheme using FEFLOW®. The model was used to simulate the impact of different load scenarios on the sustainability and impact of the development.

The modelling study revealed that the initially proposed load profile was unlikely to be sustainable. We calculated the maximum loads which could be applied sustainably to the aquifer.

The results were used to amend the original geothermal system design. This project shows the importance of completing a sustainability assessment as early as possible in the planning process.

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